



No. 4177 *The Spider Genus Tmarus (Thomisidae) in Panama*<sup>1</sup>

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In the course of my studies on Panamanian spiders I have been impressed by the frequency with which certain genera have shown their evolutionary success by their ability to multiply the number of species present in that region. One of the first genera to claim special attention was *Dipoena* (Theridiidae) in which I have already described twenty-one new Panamanian species (1943). *Lyssomanes*, *Corythalia*, *Freya*, *Phiale*, *Metaphidippus*, and *Cobanus* are very successful genera from the Salticidae (Chickering, 1946). The present paper will add *Tmarus* to this list which, eventually should offer a good opportunity to study the course of evolution among these animals.

The work of preparing this paper was chiefly done while I was a guest of the Museum of Comparative Zoölogy at Harvard College. It gives me great pleasure again to acknowledge my indebtedness to the following members of the staff of the Museum for their continued encouragement and repeated courtesies: Dr. A. S. Romer, Director; Dr. Joseph C. Bequaert; Miss Elizabeth B. Bryant; Mr. Ludlow Griscom, Editor of the Bulletin of the Museum of Comparative Zoölogy.

### Genus *T*MARUS Simon, 1875

O. P.-Cambridge (1892) described seven species of *Tmarus* from Panama. F. P.-Cambridge (1900) continued these studies and made minor changes but added no new species. Petrunkevitch (1925) had a single immature female from the Wilcox camp on the San Lorenzo River but he did not place it in any species. Banks (1929) reported *T. intentus* O. P.-Cambridge and *T. studiosus* O. P.-Cambridge from Fort Davis and Barro Colorado Island, C. Z., respectively. I believe that Banks' specimen identified as *T. intentus* is *T. ineptus* and I have so treated it in this paper. So far as I am aware, no other species have been described or reported from Panama until the preparation of this paper. The already known species together with those which I have recognized as new to science may be listed as follows: *Tmarus aculeatus* sp. nov.; *T. bucculentus* sp. nov.; *T. cognatus* sp. nov.; *T. contortus* sp. nov.; *T. corruptus* O. P.-Cambridge; *T. curvus* sp. nov.; *T. decens* O. P.-Cambridge; *T. ineptus* O. P.-Cambridge; *T. intentus* O. P.-Cambridge; *T. morosus* sp. nov.; *T. mundulus* O. P.-Cambridge; *T. pauper* O. P.-Cambridge; *T. parki* sp. nov.; *T. peregrinus* sp. nov.;

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*T. probus* sp. nov.; *T. productus* sp. nov.; *T. sigillatus* sp. nov.; *T. studiosus* O. P.-Cambridge. Four of these are known only from females, seven are known only from males, and the remaining seven are known from both sexes.

In order to avoid needless repetition in the descriptions certain information in which the species appear to be quite consistent is given here rather than in the material dealing with each species. The two tarsal claws are pectinated in a single row of eight or nine slender teeth. There still remains some uncertainty regarding the distribution of trichobothria and I am convinced that special attention should be given these organs in the near future. Apparently all species examined by me have trichobothria on the first pair of legs as follows: tarsus with a median dorsal row of five; metatarsus with a median dorsal row of three in distal half of segment; tibia with a dorsal row of five or six together with a loose cluster of five or six prolateral to the most proximal of the dorsal row.

#### *Key to the known species of Tmarus from Panama*

##### Males

1. Species with embolus definitely and conspicuously curled either at anterior end of bulb on ventral side or on retrolateral side . . . . . 2
1. Species with embolus either extended more or less around margin of bulb and not definitely curled or apparently restricted to anterior end of bulb . . . . . 5
2. Palp: tibial apophyses short, only ventral one strongly chitinized; cymbium deeply excavate at retrolateral basal corner; embolus deeply grooved, arises near middle of anterior border of bulb, makes a complete retrolateral circle and then loops across middle of bulb again (Fig. 4) . . . . .  
*T. contortus*, (p. 224)
2. Without palpal features as given above . . . . . 3
3. Palp: tibia deeply excavate retrolaterally and distally; with a strongly chitinized apophysis of moderate length ventral to excavation; embolus makes a complete circle distal to anterior margin of bulb and then passes retrolaterally to terminate in a finely dentate tip (Fig. 7) . . . . .  
*T. curvus*, (p. 228)
3. Without palpal features as given above . . . . . 4
4. Palp: ventral retrolateral tibial apophysis strongly chitinized and distally knobbed, the dorsal retrolateral apophysis a sharply pointed spine; near anterior margin of bulb the embolus turns toward base and then passes to retrolateral side and extends nearly to tip of cymbium as a long slender filament (Fig. 13) . . . . . *T. morosus*, (p. 235)
4. Palp: with a pair of long slender retrolateral apophyses almost meeting distally, and with a hook attached near base of shorter apophysis;

- deeply grooved embolus makes a loop near distal margin of bulb and a second loop near base of bulb and continues as a fine filament to distal end of cymbium (Fig. 25) . . . . . *T. productus*, (p. 249)
5. Species with at least the dorsal retrolateral tibial apophysis elongated and well developed . . . . . 6
5. Species with retrolateral tibial apophyses less well developed; either with but one apophysis or with two shorter and poorly developed . . . . . 10
6. Palp: tibia with a short ventral retrolateral apophysis expanded distally, and a long slender curved retrolateral dorsal apophysis reaching to tip of cymbium and bifurcated distally; bulb with a basal hook; embolus curves along distal border of bulb and ends in a distal bifurcation (Fig. 1) . . . . . *T. aculeatus*, (p. 217)
6. Without palpal features as given above . . . . . 7
7. Palp: dorsal tibial apophysis bent at a right angle and extending nearly to distal border of bulb; bulb with a strongly chitinized ridge which runs, in general, obliquely across and terminates in a pointed spine on pro-lateral side; embolus arises on pro-lateral side near base, extends around margin to anterior border and there dilates and finally terminates in a slender spine which extends across to retrolateral margin of cymbium (Fig. 19) . . . . . *T. parki*, (p. 242)
7. Without palpal features as given above . . . . . 8
8. Palp: tibia with a pair of well developed retrolateral apophyses, the ventral one slender, well chitinized, somewhat hooked distally, the larger dorsal one much larger, flattened, extending beyond middle of cymbium; bulb with a prominent basal hook and two hooks near distal margin (Fig. 21) . . . . . *T. peregrinus*, (p. 245)
8. Without palpal features as given above . . . . . 9
9. Palp: two retrolateral apophyses well developed and well chitinized, ventral one a short hook, dorsal one long, slender, with denticles along its lateral border; bulb with a short stout basal spine, a central semi-lunate ridge, and with embolus probably encircling the bulb and terminating in a slender retrolateral spine (Fig. 23) . . . . . *T. probus*, (p. 247)
9. Palp: with two well developed and well chitinized retrolateral apophyses, the ventral one shorter and hook-like, the dorsal one long slender, with a prominent tooth about one third from base; bulb with a slender spine near middle on retrolateral side and a strongly ridged and chitinized area on retrolateral side near distal margin (Fig. 29) . . . . .  
*T. studiosus*, (p. 254)
10. Palp: tibia with a short blunt massive ventral retrolateral apophysis and a short, sharply pointed, dorsal retrolateral apophysis; bulb with two contiguous beak-like processes near distal border (Fig. 10) . . . . .  
*T. ineptus*, (p. 232)
10. Without palpal features as given above . . . . . 11
11. (Taken from the Cambridges). Palp: tibia with only a short ventral retrolateral apophysis, with the dorsal one represented by an enlarged "angle"; bulb with a single, somewhat broadly bifurcate process near anterior margin . . . . . *T. intentus*, (p. 234)
11. Without palpal features given above . . . . . 12

12. Palp: both tibial apophyses blunt and massive, each tipped by a short chitinized point; bulb with a central, lightly chitinized hook and embolus arising on prolateral side and extending to anterior margin where it makes a right angle turn and abruptly inflates and then terminates in a slender point (Fig. 16) . . . . . *T. mundulus*, (p. 239)
12. Without palpal features as given above . . . . . 13
13. (Taken from the Cambridges). Palp: tibia with two short blunt retrolateral apophyses, the ventral one turned retrolaterally; "bulb convoluted in the center, bearing a stout hammer-headed chitinous process directed backward and downward"; embolus apparently encircles the bulb and "curls in over the bulb from outer side" . . *T. pauper*, (p. 242)
13. Palp: tibia with two distal retrolateral apophyses, the ventral one a strongly chitinized, stout, blade-like spur, the dorsal one a blunt, rounded, strongly chitinized process concave toward the spur; bulb deeply excavated toward retrolateral side, with two basal spines, one contiguous to tibial spur, the other a distinct hook directed prolaterally and proximally; embolus extends around nearly three fourths of the margin of the bulb and terminates in a marked dilation which is abruptly truncated at its tip (Fig. 28) . . . . . *T. sigillatus*, (p. 252)

### Females

1. Epigynum, including spermathecae, definitely longer than wide . . . . . 2
1. Epigynum, including spermathecae, either about as wide as long or definitely wider than long . . . . . 6
2. Epigynal plate twice as long as wide, mildly narrowed in middle; with two large apertures at posterior end (Fig. 2) . *T. bucculentus*, (p. 220)
2. Without epigynal features as given above . . . . . 3
3. Epigynal plate less than twice as long as wide; with a large anterior depression somewhat wider than long; with much elongated spermathecae extending nearly to genital groove (Fig. 3) . . . . . *T. cognatus*, (p. 222)
3. Without epigynal features as given above . . . . . 4
4. Epigynal plate with a transverse depression at anterior end, the depression with a pair of openings nearly two diameters of one of them apart; with three pairs of rounded spermathecal parts (Fig. 5) . *T. contortus*, (p. 224)
4. Without epigynal features as given above . . . . . 5
5. Epigynal plate with a pair of elongated openings less than a diameter of one of them apart, near anterior border; elongated and twisted spermathecae extend almost to genital groove (Fig. 8) . . . . . *T. curvus*, (p. 228)
5. Epigynal plate with a distinct small raised lip near anterior border and a large, somewhat triangular and heavily chitinized area behind the lip (Fig. 31) . . . . . *T. studiosus*, (p. 254)
6. (Taken from the Cambridges). Epigynal plate a somewhat oval area near genital groove; with a pair of rounded, nearly circular spermathecae within the area of the plate and less than the radius of one of them apart, and each with a pair of slender tubules arising on lateral side (Fig. 6) . . . . . *T. corruptus*, (p. 228)



6. Without epigynal features as given above.....7
7. (Taken from the Cambridges). Epigynal plate almost touching the genital groove, enclosing a pair of spiraloid concavities (Fig. 9).....  
*T. decens*, (p. 231)
7. Without epigynal features as given above.....8
8. Epigynal plate with an oval depression and a pair of oval spermathecae extending behind the depression almost to genital groove (Fig. 11)....  
*T. ineptus*, (p. 232)
8. Without epigynal features as given above.....9
9. Epigynal plate with a short broad tongue between anterior ends of a pair of reniform spermathecae which reach nearly to genital groove; with a pair of small apertures on medial side of spermathecae anterior to their concavity (Fig. 12).....*T. intectus*, (p. 234)
9. Without epigynal features as given above.....10
10. Epigynal plate with a central scutiform area; a pair of apertures lateral to scutiform area; several coiled parts of spermathecae more or less surrounding central area (Fig. 15).....*T. morosus*, (p. 235)
10. Epigynal plate with a relatively large depression in anterior half; posterior border of depression irregular in outline; apertures lie within anterior depression (Fig. 18).....*T. mundulus*, (p. 239)

## TMARUS ACULEATUS spec. nov.

## Figure 1

*Male holotype.* Total length from clypeus to tip of anal tubercle 4.832 mm. Carapace 1.696 mm. long; 1.440 mm. wide opposite second coxae where it is widest; .768 mm. tall and, therefore, about .53 as tall as wide; almost level from PME to beginning of steep posterior declivity opposite third coxae from which place declivity descends steeply and slightly arched to posterior border; a definite thoracic groove seems totally lacking; smooth posterior declivity without spines, but with a pair of long slender spines on each side and a transverse row of six similar ones lying at the top of the declivity; in front of these there is a transverse row of three spines and a single long one just posterior to PLE and three smaller spines in the interval between LE; ventral margin less fully rounded than in such species as *T. mundulus*.

*Eyes* Eight in two rows, all diurnal; tubercles around LE less prominent than in such species as *T. mundulus*, otherwise essentially the same; viewed from above, posterior row strongly recurved; viewed from in front, anterior row slightly procurved, measured by centers; central ocular quadrangle wider behind than in front in ratio of 19 : 14, wider behind than long in ratio of 19 : 17; posterior row occupies about three quarters of the total width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 3 : 6 : 4 : 5.5. AME separated from one another by eight thirds of their diameter, from

ALE by five halves of their diameter. PME separated from one another by nearly three times their diameter, from PLE by nearly three and a half times their diameter. Laterals separated by slightly more than twice the diameter of ALE. Clypeus quite strongly porrect. Width of clypeus equal to slightly more than five times the diameter of AME. Clypeus with a single slender spine near middle beneath interval between AME and a row of six slender spines along ventral margin.

*Chelicerae.* Slightly porrect; parallel; fairly robust; with a well defined basal boss; basal segment .644 mm. long; with numerous short bristles, especially along median margin, and two long slender spines near middle of anterior surface; fang short, robust at base and somewhat sinuous along outer margin; fang groove apparently without teeth.

*Maxillae.* Slightly convergent, extend far beyond tip of lip; basal half somewhat inflated, distal half slender; considerably depressed and constricted in middle; longer than wide in middle in ratio of 4 : 1; palp inserted into second fifth.

*Lip.* Very narrow at base, widest in middle; longer than wide in middle in ratio of 2 : 1. Sternal suture straight or slightly recurved.

*Sternum.* Broadly scutiform; longer than wide between second coxae, where it is widest, in ratio of 39 : 31; moderately well supplied with bristles and moderately convex; posterior end a blunt point not extended between fourth coxae which are separated by about five twelfths of their width.

*Legs.* 1243. Width of first patella at knee .244 mm., tibial index of first leg 9. Width of fourth patella at knee .200 mm., tibial index of fourth leg 14.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.176	.704	1.856	1.344	.960	7.040
2.	2.176	.736	1.792	1.344	.896	6.944
3.	1.216	.416	.960	.576	.544	3.712
4.	1.344	.448	.960	.576	.576	3.904
Palp	.544	.256	.128 <sup>1</sup>	—	.768	1.696

*Spines.* First leg: femur dorsal 0-0-1-1-1-0, prolateral 1-1-1-1-0, retrolateral 0-0-1-1-0, ventral 0; patella dorsal 1(weak)-1; prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-2(staggered)-2-0; metatarsus dorsal 0,

<sup>1</sup> Exclusive of apophysis; applies to all male palpal tibiae.

prolateral and retrolateral 0-1-0-0, ventral 1r-2-2-2(offset laterally). Second leg: essentially as in first. Third leg: femur dorsal 0-1-1-0, prolateral 1-1-1-0, retrolateral 0; patella only dorsal 1-1; tibia dorsal 0-1-1-0, prolateral and retrolateral 0-0-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 2-2-0. Fourth leg: essentially as in third.

*Palp.* Among the more complicated found in the genus. No modifications except in tibia and tarsus. Body of tibia very short; with two strongly developed apophyses; ventral apophysis a short strongly chitinized process turned dorsolaterally and greatly expanded at its distal end; the dorsal apophysis is a very long, strongly chitinized process bifurcated at its distal end which extends to tip of tarsus. Bulb also rather complicated with a strongly chitinized hook at its base and a process arising near middle of prolateral side and curving around distal border nearly to middle of retrolateral wide where it also ends in a bifurcated tip (Fig. 1).

*Abdomen.* Long and slender; longer than wide in ratio of 16 : 5; widest about one third from base but nearly as wide at base; dorsum without tubercles, but with numerous long slender spines; six spinnerets as usual in the genus; colulus appears to be represented by a minute group of black bristles; tracheal spiracle with a distinct lip near base of anterior pair of spinnerets; dorsal sigilla very obscure.

*Color in alcohol.* Carapace generally a medium amber color with bright reddish markings; a pair of small reddish spots lie between PME; a pair of short broad broken reddish stripes extend from PME and PLE to beginning of steep posterior declivity; with a reddish marginal stripe from opposite PLE to posterior border, very narrow at first but broadening posteriorly; with a few reddish dots on clypeus. Legs yellowish, mottled with reddish especially along prolateral surfaces of first and second femora. Mouth parts and sternum generally yellowish. Abdomen generally yellowish, each dorsal spine arises from a reddish dot; across the dorsum extends four narrow irregular whitish bands, the first of which crosses about one third from base, the last one about one sixth from tip; behind the last whitish band is a short dark brownish band; anal tubercle and spinnerets dark at their tips; a narrow dark band nearly surrounds the bases of the spinnerets; venter yellowish, darkened laterally.

*Type locality.* Male holotype from C. Z. Biological Area, C. Z., July, 1939. Male paratypes from the following localities: C. Z. Biological Area, C. Z., July, 1936; Ft. Davis, C. Z., August, 1936; Arraijan, R. P., August, 1936; C. Z. Forest Reserve, C. Z., July, 1939.

## TMARUS BUCCULENTUS spec. nov.

(Figure 2)

*Female holotype.* Total length 7.168 mm. Carapace 2.944 mm. long; 2.432 mm. wide opposite second coxae where it is widest; 1.024 mm. tall and, therefore, about .41 as tall as wide; grooved beneath anterior row of eyes and with swollen and protruding clypeus; nearly level behind PME mid-dorsally to steep posterior declivity which begins two thirds of distance from PME to posterior border.

*Eyes.* Eight in two rows, all diurnal; LE on prominent tubercles; PME on small tubercles; AME very slightly raised from general surface; viewed from above, posterior row rather strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider behind than in front in ratio of 31 : 23, wider behind than long in ratio of 31 : 22; posterior row occupies nearly eleven fifteenths of total width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 3 : 6.5 : 4 : 5.5. AME separated from one another by nearly eight times the diameter of one of them, from ALE by nearly six times the diameter of one of them. PME separated from one another by nearly six times the diameter of one of them, from PLE by six and one half times the diameter of one of them. Laterals separated from one another by nearly three diameters of ALE. Clypeus very porrect; width of clypeus equal to about eleven diameters of AME. Clypeus with six fairly stout spines near its ventral border and three centrally placed in the middle beneath interval between AME.

*Chelicerae.* Porrect, robust, parallel and contiguous along medial surfaces. Basal segment 1.152 mm. long. No teeth along fang groove, but promargin with a soft membranous lobe along ventral border of which extends a row of numerous stiff black bristles. Entire anterior surface with numerous black bristles.

*Maxillae.* Slightly convergent; longer than wide in middle in ratio of nearly 4 : 1; somewhat constricted across the middle; longer than lip in ratio of nearly 3 : 2. Other features as usual in the genus from Panama.

*Lip.* Longer than wide at base in ratio of about 3 : 2; widest at middle; sternal suture straight or slightly procurved; with a cluster of stiff black terminal bristles and several spines on posterior surface.

*Sternum.* Almost oval; widest at middle opposite second coxae; longer than wide in ratio of about 22 : 15; not extended between fourth coxae which are nearly contiguous.

*Legs.* 1243. Width of first patella at "knee" .512 mm., tibial index of first leg 14. Width of fourth patella at "knee" .384 mm., tibial index of fourth leg 15.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.816	1.280	2.304	1.920	1.152	9.472
2.	2.816	1.220	2.432	1.856	1.088	8.132
3.	1.984	.896	1.536	.832	.832	6.080
4.	2.240	.832	1.664	.832	.768	6.336

*Spines.* First leg: femur dorsal 0-0-1-0-1-0, prolateral 0-1-1-1-1-0, retrolateral 0-0-1-1-0; patella only dorsal 1-1, retrolateral 0-1-0; tibia dorsal 0-1-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-2-2-0; metatarsus prolateral and retrolateral 0-1-0, ventral 2-2-0-2-2. Second leg: essentially as in first. Third leg: femur dorsal 0-1-1-0, prolateral 0-1-1-0; patella as in first; tibia dorsal 0-1-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-0, ventral 0-2-0; metatarsus dorsal 0; prolateral 1-1, retrolateral 0-1-0, ventral 2-2-2(offset laterally). Fourth leg: femur dorsal 0-1-1-0, prolateral 0-0-1-0; patella and tibia as in third except tibia ventral 0-1p-0 on left and 1p-1p-0 on right; metatarsus prolateral 2-1-0, retrolateral 0-1-0, ventral 2-2-2. Palpal claw pectinate in a single row, with five or six teeth. Palpal spines: four long erect ventral spines in a row on femur with shorter ones on both sides of this row; numerous others on dorsal and lateral sides of more distal segments and especially on tarsus. Several trichobothria occur on palp, especially on dorsal surface of tibia.

*Abdomen.* Elongated and more or less cylindrical; longer than wide a little behind middle, where it is widest, in ratio of about 14 : 5; lateral sides nearly parallel; a transverse row of five spines on a slightly raised fold may indicate the site of a suppressed median dorsal tubercle; dorsal and dorsolateral areas with numerous long, slender, and apparently erectile spines. Otherwise essentially as usual in the genus from Panama.

*Epigynum.* Somewhat more than twice as long as wide; with a small anterior lip near the anterior boundary; with a pair of large apertures near posterior border (Fig. 2).

*Color in alcohol.* Carapace with a central, light reddish brown stripe as broad as entire ocular area and extending from anterior margin of clypeus to beginning of steep posterior declivity; this whole stripe is variegated with reddish brown and yellowish streaks and small dots; lateral sides yellowish white with two small reddish brown spots on each side a short distance dorsal to the narrow reddish brown ventral border. Sternum, chelicerae, lips, and palps generally light yellowish. Legs: generally light yellowish with many small reddish dots especially on prolateral surfaces of first two pairs; a narrow reddish dorsal



stripe on fourth patella and also in distal half of fourth tibia; these stripes are very faintly indicated on corresponding places on third legs. Abdomen: generally yellowish with small reddish spots lying at base of each of the numerous stout spines; beginning about three fifths from base there is a series of seven or eight narrow yellowish white irregular bars across dorsal area becoming shorter toward anal tubercle; dorso-laterally with a series of four or five long yellowish white stripes; ventro-lateral areas with small gray and reddish spots; venter a clear yellowish.

*Type locality.* Female holotype from Ft. Randolph, C. Z., August, 1936. One female paratype, C. Z. Biological Area, C. Z., August, 1936. One female paratype, Summit, C. Z., Oct., 1946 (L. H. Kraus). Loaned for study by Dr. W. J. Gertsch.

### TMARUS COGNATUS spec. nov.

#### Figure 3

*Female holotype.* Total length 3.20 mm. Carapace 1.408 mm. long, 1.28 mm. wide just behind second coxae where it is widest; .736 mm. tall and, therefore about .58 as tall as wide; very gently arched from PME to beginning of steep posterior declivity opposite third coxae; without a distinct thoracic groove; several long slender spines as well as numerous short hairs; fairly robust, but only moderately rounded from opposite PLE.

*Eyes.* Eight in two rows, all diurnal; LE on moderately prominent tubercles; PME only slightly raised from general surface; AME hardly raised at all; viewed from above, posterior row strongly recurved; viewed from in front, anterior row straight or slightly procurved measured by centers; central ocular quadrangle wider behind than in front in ratio of about 5 : 4, slightly wider behind than long; posterior row occupies about nine tenths of the width of the carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 2.5 : 4.75 : 3 : 4.5. AME separated from one another and from ALE by slightly less than three diameters of one of them. PME separated from one another by slightly more than ten thirds of their diameter, from PLE by nearly five times their diameter. LE separated from one another by slightly more than twice the diameter of PLE. Clypeus only moderately porrect. Height of clypeus (including membranous ventral margin) nearly equal to seven diameters of AME. Clypeus with a single long slender erect spine in middle of space beneath interval between AME, a row of six similar spines along ventral margin, two of these nearest median line very weak, next two lateral to these much more robust.

*Chelicerae*. Nearly vertical, essentially parallel; with a moderately well developed basal boss on each; moderately robust; basal segment .533 mm. long; fang short, robust at base, evenly curved; fang groove apparently without teeth.

*Maxillae*. Slightly convergent; extend far beyond tip of lip; basal half considerably inflated, distal half slender; palp inserted into middle third; longer than wide in middle in ratio of 23 : 7.

*Lip*. Longer than wide at base in ratio of about 2 : 1; widest at middle just beyond basal excavations; distal end slightly more than half as wide as base; with a moderately well developed scopula. Sternal suture straight.

*Sternum*. Broadly scutiform, quite convex; longer than wide in ratio of 11 : 9; widest between second coxae, but nearly as wide between first coxae; moderately well supplied with short bristles; not extended between fourth coxae which are separated by their width.

*Legs*. 1243. Width of first patella at "knee" .222 mm., tibial index of first leg 14. Width of fourth patella at "knee" .1887 mm., tibial index of fourth leg 18.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.216	.576	.960	.704	.576	4.032
2.	1.216	.448	.960	.736	.608	3.968
3.	.768	.390	.580	.416	.416	2.570
4.	1.024	.390	.640	.416	.416	2.886

*Spines*. First leg: femur dorsal and prolateral 0-0-1-1-0, retrolateral 0-0-0-1-0, ventral 0; patella only dorsal 1-1(both weak); tibia dorsal 0-1-0-1-0(judged by scars), prolateral and retrolateral 0-0-1-0, ventral 0-1p-2-0; metatarsus dorsal 0, prolateral 0, retrolateral 0-1-0, ventral 0-2-2-2. Second leg: femur as in first; patella apparently 0; tibia and metatarsus essentially as in first. Third leg: femur only dorsal 0-1-1-0 and prolateral 0-0-1-0; patella 0; tibia dorsal 0-1-0-1-0(both weak, scarcely more than bristles), prolateral and retrolateral 0-0-1-0, ventral 0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-0. Fourth leg: essentially as in third. Palpal claw and palpal trichobothria essentially as in *T. bucculentus* sp. nov.

*Abdomen*. Generally short and fairly broad; longer than wide in ratio of 13 : 10; widest about five thirteenths from posterior end and opposite the reduced posterior median tubercle; appears to have two much reduced median dorsal tubercles; the first is at base and the second is at level of widest part; anal tubercle a moderately prominent,

somewhat flattened cone; spinnerets as usual in the genus; colulus appears to be represented by a minute tuft of black bristles; tracheal tubercle near base of anterior spinnerets, obscure and without chitinous lip or tubercle.

*Epigynum.* Resembles that of *T. albolineatus* Keys. from Brazil. A moderately large central depression bounded laterally by well defined curved margins and divided by a broad septum lies at a considerable distance anterior to genital groove; a pair of small openings extend inward to notably coiled tubules and spermathecae (Fig. 3).

*Color in alcohol.* Legs generally yellowish with many small reddish, brownish, and whitish spots. First two pairs of legs darker along dorsal and prolateral surfaces. Palps yellowish with two small reddish spots on each front surface and a whitish streak along retrolateral edge on each side. Maxillae and lip yellowish. Carapace generally yellowish with a narrow median lanceolate reddish stripe behind PME, and two broad broken and irregular reddish brown stripes on each side extending from opposite the eye region to margin of steep posterior declivity. Sternum yellowish. Abdomen: dorsum highly variegated with reddish, yellowish white, and dark brown; near base there is a pair of dark irregular elongated spots diverging posteriorly; behind those are two smaller dark spots; at level of reduced posterior median tubercle is a narrow dark band which connects ventrally with a dark ventro-lateral stripe which broadens posteriorly and, much narrowed, passes anteriorly to base; venter entirely yellowish except as noted above.

*Type locality.* Female holotype and two female paratypes from C. Z. Forest Reserve, August, 1939.

#### TMARUS CONTORTUS spec. nov.

##### Figures 4-5

*Male holotype.* Total length 2.816 mm. Carapace 1.248 mm. long; 1.152 mm. wide opposite second coxae where it is widest; .576 mm. tall and, therefore, .50 as tall as wide; from just behind PME descent is very gradual to beginning of steep posterior declivity opposite third coxae; posterior declivity more gradual than in many members of the genus; a definite thoracic groove is lacking; with numerous long slender spines especially in area between posterior eyes and smooth posterior declivity and at lateral sides of this region; generally not so inflated laterally as in many species of the genus and moderately rounded from opposite PLE to posterior border.

*Eyes.* Eight in two rows, all diurnal; ocular tubercles bearing LE moderately prominent, those bearing PME slightly developed, with

AME hardly raised at all; viewed from above, posterior row strongly recurved; viewed from in front, anterior row straight measured by centers; central ocular quadrangle wider behind than in front in ratio of 4 : 3, as wide behind as long; PLE extend somewhat beyond margins of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 2 : 4.5 : 2.5 : 4.25. AME separated from one another by 2.5 times their diameter, from ALE by three times their diameter. PME separated from one another by nearly three times their diameter, from PLE by about 5 times their diameter. Laterals separated from one another by a little less than three diameters of PLE. Height of clypeus equal to nearly seven times the diameter of AME. Clypeus provided with a single long slender spine in middle beneath interval between AME, and six others along ventral margin only two of which are well developed, others so small and weak as to be little more than bristles.

*Chelicerae.* Vertical; essentially parallel; of moderate size; with well developed basal boss; basal segment .400 mm. long; each with a single long slender spine in front about one third from base situated somewhat medial to middle line, together with several bristles; fang groove and fang as usual in the genus.

*Maxillae.* Moderately convergent; extend, as usual in the genus, far beyond distal end of lip; considerably enlarged in basal half, slender in distal half; longer than wide in middle (where considerable constriction occurs) in ratio of 17 : 6; palp inserted into basal half; with a small scopula at inner distal angle and a marginal serrula which extends far laterally.

*Lip.* About twice as long as wide at base; widest in middle; about two thirds as wide at truncated distal end as at base. Sternal suture straight.

*Sternum.* Broadly scutiform; nearly as wide as long; quite convex; widest between second coxae, but nearly as wide between first coxae; with a moderate supply of stiff bristles; posterior end bluntly rounded and not extended between fourth coxae which are separated by eight ninths of their width.

*Legs.* 1243. Width of first patella at "knee" .1554 mm., tibial index of first leg 7. Width of fourth patella at "knee" .1332 mm. tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.728	.576	1.600	1.344	.768	6.016
2.	1.664	.576	1.600	1.280	.704	5.824
3.	.768	.289	.688	.422	.400	2.567
4.	.896	.311	.688	.444	.355	2.694
Palp	.422	.200	.133	—	.466	1.221

*Spines.* First leg: femur dorsal 0-1-1-0, prolateral and retrolateral 0-1-1-0, ventral 0; patella dorsal 1-0?, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 1-1-1-0, ventral 1p-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 1-1-0-0, ventral 2-2-2. Second leg: femur as in first except prolateral 0-0-1-0; patella as in first except dorsal 1-0; tibia as in first except dorsal 0-0-1-0; metatarsus as in first. Third leg: femur only dorsal 0-1-1-0 and prolateral 0-0-1-0; patella 0 (bristles replace spines); tibia dorsal 0-0-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-0. Fourth leg: essentially as in third.

*Palp.* Complicated; modifications restricted to tibia and tarsus. Tibia: with two distal ventral apophyses and one dorsal distal retrolateral apophysis; the retrolateral ventral apophysis, a stout hook, is only one strongly chitinized, others short and inconspicuous. Tarsus: deeply excavate at retrolateral basal corner; embolus arises near middle of anterior border of bulb, turns retrolaterally where it describes a complete circle perpendicular to long axis of bulb as a deeply grooved band; it then turns posteriorly and passes obliquely across the bulb and curves into a long loop with its tip turned ventrally (Fig. 4).

*Abdomen.* Slender, elongate, and pointed behind; longer than wide in ratio of 13 : 6; slightly the widest about one third from posterior end where tapering begins; well rounded at base; anal tubercle a fairly prominent, somewhat flattened cone; spinnerets as usual in the genus; colulus apparently represented by a tuft of black bristles; tracheal spiracle near base of anterior spinnerets, without chitinous lip or tubercle.

*Color in alcohol.* Carapace an amber yellowish with considerable yellowish white and red around eyes; space between PME reddish; a narrow reddish bar across the carapace extends about half way down the lateral sides and seems to be the most distinctive mark in this part of the body. Legs: generally yellowish; first two pairs finely dusted with brownish; femora one and two with a brownish prolateral stripe containing obscure reddish spots; legs three and four with a prolateral stripe extending over most of the femora, patellae, tibiae, and metatarsi, mostly brown on femora but reddish elsewhere. Mouth parts yellowish. Abdomen: generally yellowish with reddish and whitish markings, and nearly black marks especially on venter; dorsum with a pair of whitish bars which pass along lateral sides for a short distance; these whitish bars are contiguous posteriorly to a narrow reddish bar; behind these are three pairs of reddish and whitish dorsal bars, the reddish ones becoming shorter posteriorly with the last of these lying about one third from posterior end where a dark reddish narrow band



passes across the dorsum and down the lateral sides; the venter is a dusty yellowish in the middle and nearly black ventro-laterally and laterally; a narrow black band encircles the bases of the spinnerets but is incomplete dorsally.

*Female allotype.* Total length 4.608 mm. Carapace 1.664 mm. long; 1.472 mm. wide; .832 mm. tall and, therefore, nearly .57 as tall as wide; otherwise essentially as in male.

*Eyes.* Viewed from in front, anterior row slightly procurved measured by centers; central ocular quadrangle wider behind than in front in ratio of 17 : 13, slightly wider behind than long. Ratio of eyes AME : ALE : PME : PLE = 2.75 : 5.75 : 3 : 5. AME separated from one another by about three times the diameter of one of them, from ALE by slightly less than this. PME separated from one another by slightly less than twice the diameter of one of them, from PLE slightly more than twice the diameter of one of them. LE separated from one another by nearly three times the diameter of one of the PLE. Height of clypeus equal to about five times the diameter of AME if membranous ventral border is excluded. Otherwise as in male.

*Chelicerae.* Basal segment .64 mm. long. Otherwise essentially as in male.

*Maxillae, Lip, and Sternum.* Essentially as in male.

*Legs.* 1243. Width of first patella at "knee" .2664 mm., tibial index of first leg 11. Width of fourth patella at "knee" .1776 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.920	.704	1.728	1.344	.800	6.496
2.	1.856	.736	1.728	1.280	.736	6.336
3.	.960	.572	.896	.448	.440	3.316
4.	1.280	.448	.928	.576	.440 <sup>1</sup>	3.672

*Spines.* First leg: femur as in male except prolateral 0-0-1-1-0; patella apparently only retrolateral 0-1-0; tibia and metatarsus as in male. Second leg: femur dorsal 0-0-1-0-1-0, prolateral the same, retrolateral 0-0-1-1-0; patella as in first; tibia and metatarsus essentially as in male. Third leg: femur only dorsal 0-1-0-1-0; patella only dorsal 0-1; tibia only dorsal 0-1-0-0, prolateral 0-0-1-0, ventral 0-1p-0; metatarsus dorsal 0-1-0, elsewhere as in male. Fourth leg: essentially as in third.

*Abdomen.* Slightly damaged; generally more robust and less elongated than in male; longer than wide in ratio of 9 : 5; otherwise essentially as in male.

<sup>1</sup>Lacking in allotype; introduced from third leg.

*Epigynum.* Consists simply of a central transverse slit considerably anterior to genital groove with a small aperture at each end. The central slit appears to open into a pouch. Internally several coiled tubules and spermathecae are visible through the surface (Fig. 5).

*Color in alcohol.* Everywhere except on abdomen essentially as in male. Abdomen: with much less clearly developed pattern of cross bars than in male and with much more white on dorsum; ventrolaterally and laterally with less dark coloration.

*Type locality.* Male holotype, female allotype, together with one male paratype and three immature specimens from Madden Dam region in brush, C. Z., August, 1939.

### TMARUS CORRUPTUS O. P.-Cambridge, 1892

#### Figure 6

*T. mendax* O. P.-Cambridge, 1894

*T. corruptus* F. P.-Cambridge, 1900

*T. corruptus* Petrunkevitch, 1911

*T. corruptus* Petrunkevitch, 1925

Known only from the female from Mexico and Bugaba, Panama. It has not yet appeared in my collection and has not, to my knowledge, been collected since the time of the Cambridges.

### TMARUS CURVUS spec. nov.

#### Figures 7-8

*Male holotype.* Total length 2.304 mm. Carapace 1.024 mm. long; .960 mm. wide opposite second coxae where it is widest; .512 mm. tall and, therefore, about .53 as tall as wide; nearly flat behind PME to steep posterior declivity which is quite abrupt; without any definite thoracic groove; ventral margin well rounded from opposite PLE to posterior margin which is only slightly concave.

*Eyes.* Eight in two rows, all diurnal; LE on prominent tubercles; PME slightly raised; AME hardly raised from general surface; viewed from above, posterior row strongly recurved; viewed from in front, anterior row slightly procurved, measured by their centers; central ocular quadrangle wider behind than in front in ratio of 11.5 : 9, slightly wider behind than long; posterior row occupies slightly less than full width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 2 : 4 : 2.5 : 3.75. AME separated from one another by nearly three diameters of one of them, from ALE by five halves of the diameter of one of them. PME separated from one another by nearly

three diameters of one of them, from PLE by four diameters of one of them. Laterals separated from one another by two diameters of ALE. Clypeus only slightly porrect. Height of clypeus equal to nine halves of the diameter of AME. Clypeus with short bristles and probably, in life, with long slender spines as described for *T. contortus* sp. nov.

*Chelicerae*. Basal segment .4218 mm. long. Otherwise essentially as in *T. contortus* sp. nov.

*Maxillae*. Longer than wide at middle constriction in ratio of 17 : 5. Otherwise as described for *T. contortus* sp. nov.

*Lip*. Longer than wide at base in ratio of about 11 : 5; about four fifths as wide at truncated distal border as at base; widest in middle. Sternal suture straight.

*Sternum*. Posterior coxae separated by their full width. Otherwise essentially as described for *T. contortus* sp. nov.

*Legs*. 1243. Width of first patella at "knee" .1332 mm., tibial index of first leg 9. Width of fourth patella at "knee" .1110 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.152	.416	1.024	.832	.576	4.000
2.	1.184	.416	1.024	.765	.576	3.965
3.	.640	.320	.544	.320	.384	2.208
4.	.832	.320	.572	.384	.384	2.492
Palp	.320	.1776	.111	—	.400	1.009

*Spines*. First leg: femur dorsal 0-0-1-0-1-0 on right, 0-1-1-1-1-0 on left, prolateral and retrolateral 0-0-1-1-0; patella only dorsal 0-1, tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-1p-2-0; metatarsus dorsal 0, prolateral 0, retrolateral 0-1-0, ventral 2-2-2. Second leg: essentially as in first. Third leg: femur dorsal 0-1-0-1-0 and prolateral 0-0-1-0; patella only dorsal 0-1 (weak); tibia dorsal 0-0-1-0, prolateral and retrolateral 0-1-0, ventral 0; metatarsus only prolateral and retrolateral 0-0-1-0. Fourth leg: essentially as in third.

*Palp*. Complicated; only tibia and tarsus modified. Tibia deeply excavated distally on retrolateral side; with a well developed and strongly chitinized apophysis just ventral to excavation. Tarsus with a strongly chitinized bulb; embolus arises on prolateral side near base, curves along prolateral side of bulb to anterior border where it describes a complete circle and then passes to near middle of retrolateral side in a somewhat undulating fashion (Fig. 7).

*Abdomen.* Elongate ovate, pointed behind; longer than wide in ratio of 20 : 13; slightly widest about three fifths from base and tapered from this point to anal tubercle; with no indications of dorsal tubercles. Otherwise essentially as in *T. contortus* sp. nov.

*Color in alcohol.* Carapace generally amber yellowish, roughly divided into seven stripes, four dark and three light; beginning on each side at PLE a fairly broad short brownish stripe extends backward onto posterior declivity; beginning beneath PLE at margin on each side another brownish stripe extends back to posterior declivity, at first narrow but soon becoming broad; all of these are irregular and broken. Mouth parts and sternum yellowish. Legs: generally yellowish; first two pairs with considerable dusty brown color; femora of first and second pairs with a conspicuous broad brownish prolateral stripe; patellae and metatarsi of first two pairs much darkened at distal ends; all segments of first two pairs with yellowish white patches on prolateral surfaces; third and fourth legs with scattered pale brownish and reddish spots. Abdomen: dorsally with a variegated pattern difficult to describe adequately; most distinctive features seem to be a pair of basal irregular dark spots separated by a small median dorsal white spot; behind these spots are two pairs of somewhat indefinite narrow white bars separated by darker areas; extending across the widest part is an irregular black narrow bar which extends laterally to connect with broad dark lateral and ventro-lateral stripes; venter almost entirely yellowish.

*Female allotype.* Total length 3.296 mm. Carapace 1.376 mm. long; 1.28 mm. wide; .640 mm. tall and, therefore, .50 as tall as wide; otherwise essentially as in male.

*Eyes.* Central ocular quadrangle wider behind than in front in ratio of 4 : 3; wider behind than long in ratio of 8 : 7. Ratio of eyes AME : ALE : PME : PLE = 2.5 : 5 : 2.75 : 4.25. AME separated from one another by nearly three times the diameter of one of them, from ALE by slightly less than this. PME separated from one another by slightly more than three and one half times the diameter of one of them, from PLE by nearly four and one half times the diameter of one of them. Laterals separated from one another by a little more than two and one half times the diameter of PLE. Height of clypeus equal to six times the diameter of AME. Otherwise essentially as in male.

*Chelicerae.* Basal segment .555 mm. long. Otherwise essentially as in male.

*Maxillae, Lip and Sternum.* Essentially as in male.

*Legs.* 1243. Width of first patella at "knee" .2442 mm., tibial index of first leg 17. Width of fourth patella at "knee" .1998 mm., tibial index of fourth leg 21.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.152	.512	.896	.704	.576	3.840
2.	1.088	.512	.928	.704	.576	3.808
3.	.704	.320	.608	.384	.416	2.432
4.	.960	.320	.640	.448	.416	2.784

*Spines.* First leg: femur dorsal, prolateral, and retrolateral 0-1-1-0; patella 0; tibia only prolateral and retrolateral 0-0-1-0, ventral 0-2-2-0; metatarsus only ventral 0-2-2-2. Second leg: essentially as in first. Third leg: femur only dorsal 0-1-1-0; patella 0 (or dorsal 1-1, hardly more than bristles); tibia only prolateral and retrolateral 0-1-0; metatarsus only prolateral and retrolateral 0-1-0. Fourth leg: essentially as in third except metatarsus ventral 0-0-2.

*Abdomen.* More robust than in male; longer than wide in ratio of 10 : 7. Otherwise essentially as in male except for sexual features.

*Epigynum.* Simple; with two openings at considerable distance from posterior border and separated from one another by less than the width of one of them. These apertures open internally to relatively large tubules or spermathecae which extend nearly to posterior border (Fig. 8).

*Color in alcohol.* Color pattern in general like that of male but not so well delineated. Legs more definitely spotted with red and without the dark prolateral stripes found in male.

*Type locality.* Male holotype and female allotype from Canal Zone Biological Area, C. Z., August, 1936. Paratypes of both sexes from the following localities: C. Z. Biological Area, C. Z., August, 1936, July, 1939; Madden Dam region. C. Z., August, 1936; Porto Bello, R. P., August, 1936; Arraijan, R. P., August, 1936; C. Z. Forest Reserve, C. Z., July, August, 1939.

### *TMARUS DECENS* O. P.-Cambridge, 1892

#### Figure 9

*T. decens* F. P.-Cambridge, 1900

*T. decens* Petrunkevitch, 1911

*T. decens* Petrunkevitch, 1925

Known only from the female from Bugaba, Panama. It has not appeared in my collections and, apparently, has not been taken since the original collection studied by the Cambridges.



## TMARUS INEPTUS O. P.-Cambridge, 1892

## Figures 10-11

*T. ineptus* F. P.-Cambridge, 1900

*T. ineptus* Petrunkevitch, 1911

*T. ineptus* Petrunkevitch, 1925

*T. intentus* Banks, 1929

The Cambridges had only females. Males are fairly numerous in my collection. The male allotype is here described in detail in accord with my usual method.

*Allotype male.* Total length (exclusive of the chelicerae) 3.13 mm. Carapace 1.248 mm. long; 1.28 mm. wide opposite second coxae where it is widest; .576 mm. tall and, therefore, about .45 as tall as wide; very gently arched behind PME to nearly opposite third coxae where steep posterior declivity begins and continues with a steeply arched decline to posterior border which is only gently notched; without a distinct thoracic groove; smooth posterior declivity without spines; a procurved row of three long slender spines just lateral and posterior to PME, a slightly recurved row of three somewhat more robust long slender spines a little more than one half the distance from first row to beginning of posterior declivity where another row of four long slender spines occurs; lateral to the lower part of the posterior declivity occur three more of these long spines on each side; ventral margin well rounded from below intertubercular space separating LE to posterior border.

*Eyes.* Eight in two rows, all diurnal; LE on large prominent tubercles, PME on small tubercles, AME hardly raised from general surface; viewed from above, posterior row strongly recurved; central ocular quadrangle wider behind than in front in ratio of 3 : 2, slightly wider behind than long; posterior row occupies seven tenths of width of carapace at that level. Ratio of eyes AME : ALE : PME : PLE = 2.3 : 4.5 : 3 : 4. AME separated from one another by nearly two and one half times the diameter of one of them, from ALE by three times the diameter of one of them. PME separated from one another by three times the diameter of one of them, from PLE by nearly four times the diameter of one of them. LE separated from one another by a little more than twice the diameter of ALE. Clypeus only moderately porrect. Height of clypeus equal to about five and one half times the diameter of AME. Clypeus decorated by a single long slender spine well beneath interval between AME and a row of four similar bristles near margin beneath ALE. A chitinous nodule at outer ventral corner of clypeus.

*Chelicerae*. Nearly vertical and parallel; apparently with only an obscure basal boss; moderately robust; basal segment .448 mm. long; fang short, robust at base, regularly curved; fang groove apparently without teeth.

*Maxillae*. Moderately convergent; extend far beyond tip of lip; basal half rather inflated and definitely convergent so that lip appears narrow at base; palp inserted into middle third; more than three times as long as wide at narrowest place, just beyond middle.

*Lip*. Longer than wide at base in ratio of about 3 : 1; widest near middle.

*Sternum*. Broadly scutiform; longer than wide in ratio of about 8 : 7; moderately well supplied with bristles, the most anterior of which are spiniform; widest between second coxae, but nearly as wide between first coxae; not extended between fourth coxae which are separated by about two thirds of the width of one of them.

*Legs*. 1243. Width of first patella at "knee" .222 mm., tibial index of first leg 8. Width of fourth patella at "knee" .1554 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.240	.704	2.048	1.728	.832	7.552
2.	2.176	.640	1.856	1.408	.832	6.912
3.	.970	.320	.896	.448	.448	3.082
4.	1.088	.384	.832	.480	.448	3.232
Palp	.444	.199	.155	—	.422	1.220

*Spines*. First leg: femur dorsal 0-0-1-1-1-0, prolateral 0-0-1-1-1-0, retrolateral 0-0-1-1-0, ventral 0; patella dorsal 1-1, prolateral 0-1-0 on left and 0-1-1-0 on right; tibia dorsal 0-1-0-1-0, prolateral 0-1-0-1-1-0, , retrolateral 0-1-1-1-0, ventral 0-2-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-1-0, ventral with seven spines irregularly distributed. Second leg: essentially as in first with few variations. Third leg: femur dorsal 0-1-1-1-0, prolateral 0-0-1-0, ventral 0-0-1p-0; patella only dorsal 1-1; tibia dorsal and prolateral 0-1-1-0, retrolateral 0-0-1-0, ventral only 0-1p-0; metatarsus prolateral and retrolateral 1-1-1 (first and last weak), ventral 0-2-1r-0. Fourth leg: femur and patella essentially as in third; tibia dorsal, prolateral, and retrolateral 0-1-1-0, ventral 0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-1p-0. Palpal spines: several very long slender dorsal spines on patella and tibia with a single one near base of tarsus.

*Palp*. Among the simplest found in the genus; tibia with a short, weakly developed, membranous, retrolateral apophysis having a short,

strongly chitinized tubercle near its base. Tarsus: bulb simple, nearly as broad as long; with a short, apparently bifurcate spine emerging from a broad anterior opening (Fig. 10).

*Abdomen.* Elongate; longer than wide in ratio of 30 : 13; blunt at base; slightly the widest just anterior to much reduced median dorsal tubercle; tapered from this widest region to anal tubercle; quite spinose dorsally with a group of more or less erect dorsal and somewhat more robust spines at base; about one third from base there is a pair of robust erect spines, each on a small tubercle; with four dorsal sigilla quite plainly indicated in anterior half; six spinnerets compactly grouped with posterior pair the longest, but with none greatly elongated. Colulus not visible. Tracheal spiracle near base of spinnerets with a ventral, slightly chitinous lip.

*Color in alcohol.* Legs: generally yellowish, lighter below; first and second femora and patellae mottled with brown prolaterally and, less so, retrolaterally. Mouth parts as in legs except mottled areas; chelicerae mottled with brown in front, palpal femora retrolaterally. Carapace: with a broad light stripe through middle from opposite ALE to posterior border, narrowed at beginning of steep posterior declivity and near posterior margin; elsewhere darker with irregular brown stripes and flecks. Sternum yellowish. Abdomen: dorsal area whitish with red dots, especially at bases of spines, many light irregular pinkish lines and small brownish spots; a nearly black spot at each anterior dorsal corner; with several lateral narrow broken alternate whitish and brownish stripes; ventro-laterally yellowish white with central region of venter yellowish with narrow light brownish stripes; a black patch covers area of genital furrow.

*Type locality.* Male allotype from C. Z. Biological Area, C. Z., July, 1939. Numerous male paratypes and females from the following localities: C. Z. Biological Area; June-July, 1934; July 1943-March 1944 (Berlese funnel, Dr. Zetek); Ft. Randolph, C. Z., August, 1936; El Valle, R. P., July, 1936; Balboa, C. Z., August, 1936; Porto Bello, R. P., August, 1936; Arraijan, R. P., August, 1936; Madden Dam region, Chilibre, Frijoles, Ft. Sherman, C. Z., August, 1939.

#### TMARUS INTENTUS O. P.-Cambridge, 1892

##### Figure 12

*T. intentus* F. P.-Cambridge, 1900

*T. intentus* Petrunkevitch, 1911

*T. intentus* Petrunkevitch, 1925

The Cambridges had what they considered the male from Guatemala and the female from Panama. I have two females from the Canal Zone

Biological Area, July, 1936 which I believe belong to this species. The male has not been taken so far as I know, since the original collection in Guatemala. Figure 12 is drawn from one of my specimens. I have already indicated that I consider Mr. Banks' record of *T. intentus* from Ft. Davis, C. Z. as due to a misidentification of *T. ineptus*.

*TMARUS MOROSUS* spec. nov.

Figures 13-15

*Male holotype.* Total length 3.264 mm. Carapace 1.236 mm. long; 1.152 mm. wide opposite second coxae where it is widest; .608 mm. tall and, therefore, about .53 as tall as wide; descent behind PME gentle to steep posterior declivity which descends quite abruptly to posterior border; without a definite thoracic groove; with the usual long slender spines arranged along margin of smooth posterior declivity and in three rows behind posterior row of eyes; regularly and quite fully rounded along ventral margin from constriction opposite insertion of palps to posterior border.

*Eyes.* Eight in two rows, all diurnal; LE on prominent tubercles; confluent; PME on separated low tubercles; AME very slightly raised from general surface; viewed from above, posterior row strongly recurved; viewed from in front, anterior row straight or slightly procurved measured by centers; central ocular quadrangle wider behind than in front in ratio of 12 : 7, almost exactly as long as wide behind; posterior row occupies six sevenths of width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 2 : 5 : 3 : 5. AME separated from one another by two diameters of one of them, from ALE by five halves of the diameters of one of them. PME separated from one another by slightly more than seven thirds of the diameter of one of them, from PLE by eleven thirds of the diameter of one of them. Laterals separated from one another by nearly two diameters of one of them. Clypeus moderately porrect, less so than in female; with seven long slender spines near ventral border. Height of clypeus equal to six diameters of AME (including the membranous ventral border).

*Chelicerae.* Slightly porrect, much less so than in female; parallel; somewhat convex near middle in front; with several long slender spines in front in medial half; with well developed basal boss from which a chitinous ridge extends to middle of lateral side. Other features as usual in the genus.

*Maxillae.* Slightly convergent; longer than lip in ratio of 20 : 13; longer than wide at middle constriction in ratio of 10 : 3; robust in basal half, slender in distal half; with a fairly well developed scopula

at inner distal angle and with a serrula which extends nearly to middle constriction.

*Lip.* Longer than wide at base in ratio of 13 : 5; widest in middle; distal end rounded, with a tuft of dark stiff bristles. Sternal suture straight.

*Sternum.* Broadly scutiform; longer than wide in ratio of 16 : 13; quite convex; widest between second coxae. but nearly as wide between first coxae; posterior end bluntly pointed and not extended between fourth coxae which are separated by three fifths of their width.

*Legs.* 123=4. Width of first patella at "knee".1998 mm., tibial index of first leg 7. Width of fourth patella at "knee" .1554 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.432	.736	2.304	1.984	.960	8.416
2.	2.272	.672	1.984	1.728	.864	7.520
3.	1.024	.416	.960	.512	.512	3.424
4.	1.152	.416	.896	.512	.448	3.424
Palp	.422	.222	.167	—	.511	1.322

*Spines.* First leg: femur dorsal 0-0-1-1-0, prolateral 0-1-1-1-0, retrolateral 0-0-0-1-0; patella 0(all replaced by bristles); tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-1-1-0, ventral 0-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-2 (all irregular in placement)-0. Second leg: essentially as in first. Third leg: femur only dorsal 0-1-1-0; elsewhere 0. Fourth leg: essentially as in third except metatarsus ventral 0-1p-0.

*Palp.* Moderately complicated; only tibia and tarsus modified; tibia with two retrolateral apophyses, the ventral one a strongly chitinized, curved, and knobbed process, the dorsal one a long, moderately robust spur. Tarsus: with an embolus which becomes free near anterior margin of bulb, turns toward base and extends onto retrolateral side of cymbium as a long slender and somewhat sinuous thread (Figs. 13-14).

*Abdomen.* Elongated; longer than wide in ratio of 33 : 12; blunt at base; nearly parallel-sided back to within about one third of distal end from where it tapers to anal tubercle; a fairly conspicuous median dorsal tubercle projecting posteriorly just a little anterior to anal tubercle to make a small "caudal" appendage, less pronounced than in female; midway between base and median tubercle are two small incipient dorsal tubercles each bearing a long slender spine; other features as usual in the genus.



*Color in alcohol.* Essentially as described for the female, but less distinct than in that sex.

*Female allotype.* Total length 5.312 mm. Carapace 1.984 mm. long, 1.632 mm. wide opposite posterior border of second coxae; .768 mm. tall and, therefore, about .47 as tall as wide; nearly level behind PME to steep posterior declivity which descends steeply to moderately concave posterior border; without a definite thoracic groove; with the usual dorsal spines; ventral margin slightly constricted opposite second coxae as well as more deeply at lateral sides of clypeus; only moderately rounded laterally.

*Eyes.* Eight in two rows, all diurnal; LE on prominent tubercles; PME considerably raised on separate small tubercles; AME hardly raised from general surface; viewed from above, posterior row strongly recurved; viewed from in front, anterior row slightly procurved measured by centers; central ocular quadrangle wider behind than in front in ratio of 17 : 11, wider behind than long in ratio of 17 : 16; posterior row occupies about five sixths of width of carapace beneath PLE. Ratio of eyes AME : ALE : PME : PLE = 2.5 : 6.5 : 3 : 6. AME separated from one another by five halves of the diameter of one of them, from ALE by three diameters of one of them. PME separated from one another by seven halves of the diameter of one of them, from PLE by nearly five times the diameter of one of them. Laterals separated from one another by eleven sixths of the diameter of PLE. Clypeus very porrect, thus extending the length of carapace; with numerous short bristles and seven long slender spines near ventral margin, the middle one set lower down than usual. Width of clypeus, including membranous ventral border, equal to seven diameters of AME.

*Chelicerae.* Very porrect; parallel; robust; with well developed basal boss and a ridge from boss two thirds to distal end; with a group of fourteen or fifteen short spines arranged along median third of front surface; basal segment .733 mm. long. Fang and fang groove as usual in the genus.

*Maxillae.* Almost parallel; longer than lip in ratio of 3 : 2; longer than wide at middle constriction in ratio of nearly 10 : 3; moderately inflated in basal half, slender in distal half; with a fairly well developed scopula at inner distal angle and with a serrula which extends far over the lateral border.

*Lip.* Longer than wide at base in ratio of 2 : 1; widest in middle; about half as wide at tip as at base. Sternal suture slightly procurved.

*Sternum.* More elongate than usual in the genus from Panama; longer than wide in ratio of 47 : 35; widest between second coxae;

moderately convex; with a well developed covering of stiff bristles; posterior end pointed and not extended between fourth coxae which are separated by about one third of the width of one of them.

*Legs.* 1243. Width of first patella at "knee" .3552 mm., tibial index of first leg 10. Width of fourth patella at "knee" .1998 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.944	1.024	2.496	1.984	1.152	9.600
2.	2.720	1.024	2.368	1.856	1.088	9.056
3.	1.344	.544	1.280	.640	.640	4.448
4.	1.600	.544	1.280	.672	.640	4.736

*Spines.* First leg: femur dorsal 0-0-1-1-0, prolateral 0-1-1-1-0, retrolateral 0-0-1-1-0, ventral 0; patella dorsal 1-1(both little more than bristles), prolateral 0-1-0; tibia dorsal 0-1-0-0-1-0, prolateral 0-1-1-1-0, retrolateral 0-0-1-1-0, ventral 0-1p-2-2(bristles); metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-1p-2-0-2-1p-2. Second leg: femur, patella, and tibia as in first except patella prolateral 0 and tibia prolateral 0-0-1-1-0; metatarsus prolateral and retrolateral 0-1-0, ventral 0-2-2-2. Third leg: femur only dorsal 0-1-1-0 and prolateral 0-0-1-0; patella dorsal 1-1, prolateral 0-1-0(all patellar spines little more than bristles); tibia dorsal 1(weak)-0-1-0, prolateral and retrolateral 0-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-0. Fourth leg: femur and tibia as in third; patella prolateral 0, retrolateral 0-1-0; metatarsus prolateral 0-1-1, retrolateral 0-1-0, ventral 0-2-1p. Palpal spines: numerous on last three segments but without definite or at least regular placement. Palpal claw pectinate in a single row of seven or eight slender teeth.

*Abdomen.* Elongated; longer than wide in ratio of 25 : 11; with a conspicuous median dorsal tubercle just above the spinnerets, thus forming a distinct "caudal appendage"; blunt and squarely truncated at base; other features as usual in the genus.

*Epigynum.* Complicated; a short distance in front of the posterior border are two black dots about seven diameters of one of them apart; somewhat anterior to the dots there is a scutiform area with several ridges, pockets, and apertures forming a design difficult to describe adequately; several internal tubules showing through the surface layer add to the complexity of the design (Fig. 15).

*Color in alcohol.* Carapace: highly variegated with brownish and whitish streaks radiating from the top of the steep posterior declivity; also many fine reddish dots generally distributed; a thin red line runs

laterally just dorsal to ventral margin. Legs: generally much dotted and spotted with red and brown; first and second femora with a broad stripe throughout on prolateral and ventral surfaces with prolateral half brownish and ventral half reddish. Lip, chelicerae, maxillae, and sternum all yellowish with reddish dots and streaks. Abdomen: with the most distinctive color features; a distinct dorsal folium throughout the length of the abdomen, lighter through the middle but darker along the lateral sides; all the way around there is a whitish stripe contiguous to brownish border of the folium; lateral sides striated by narrow alternate and more or less broken brownish and whitish stripes; venter light colored with a somewhat darker stripe through the center with a lighter stripe on each side and a longitudinal row of brownish dots lateral to those.

*Type locality.* Male holotype from C. Z. Biological Area, C. Z., June, 1936; female allotype from Madden Dam region, from low bushes, August, 1939. Several male and female paratypes from the following localities: C. Z. Biological Area, C. Z. Forest Reserve, Chilibre, C. Z., and Fort Sherman, C. Z., August, 1939.

#### *TMARUS MUNDULUS* O. P.-Cambridge, 1892

##### Figures 16-18

*T. mundulus* F. P.-Cambridge, 1900

*T. mundulus* Petrunkevitch, 1911

*T. mundulus* Petrunkevitch, 1925

The Cambridges had only females and the species has not been reported since their time, so far as I know. The species appears to be common in the regions where I have worked in Panama and both sexes are numerous in my collection. The male allotype has been selected and is herewith described in detail.

*Male allotype.* Total length 2.688 mm. from clypeus to tip of anal tubercle. Carapace 1.152 mm. long; 1.152 mm. wide opposite second coxae where it is widest; .512 mm. tall and, therefore, about .44 as tall as wide; tallest in region of PLE; arched essentially as in *T. ineptus*; thoracic groove lacking; smooth posterior steep declivity without spines but with a row of three long curved slender spines on each side of posterior declivity; with a transverse row of the same type of spines at top of posterior declivity; with a row of three similar spines on each side behind PLE meeting at top of posterior declivity; with a few other spines less definitely placed; ventral margin constricted sharply just lateral to insertion of chelicerae from which place it is well rounded to posterior surface.

*Eyes.* Eight in two rows, all diurnal; LE on large, rather prominent tubercles well separated by a deep groove; PME on smaller tubercles;

AME hardly raised from general surface; viewed from above, posterior row strongly recurved; viewed from in front, anterior row slightly recurved measured by centers; central ocular quadrangle wider behind than in front in ratio of about 13 : 8, slightly longer than wide behind; posterior row somewhat wider than carapace below PLE because of extension of ocular tubercles. Ratio of eyes AME : ALE : PME : PLE = 2.3 : 4.3 : 3 : 4. AME separated from one another by nearly twice their diameter, from ALE by nearly 2.2 times their diameter. PME separated from one another by a little more than twice their diameter, from PLE by three and one half times their diameter. Laterals separated from one another by a little more than twice the diameter of PLE. Clypeus only moderately porrect. Height of clypeus equal to a little more than four diameters of AME. Clypeus decorated only with very slender spines most of which have been broken off by handling.

*Chelicerae.* Nearly vertical, only slightly porrect; essentially parallel; with a moderately well developed basal boss; moderately robust; basal segment .488 mm. long; fang moderately robust at base, short, evenly curved; fang groove apparently without teeth but with a moderately well developed scopula along promargin.

*Maxillae.* Slightly convergent with inclination in distal halves; somewhat dilated in basal halves contiguous to lip; palp inserted into middle third; extends far beyond tip of lip; widest at insertion of palp where it is nearly five halves as wide as at constriction just distal to place of attachment; with well developed scopula at distal margin and medial to this region.

*Lip.* Longer than wide at base in ratio of nearly 2 : 1; widest about one third from base; distal end well rounded and moderately tapered.

*Sternum.* Broadly scutiform; moderately convex; widest between second coxae where it is slightly wider than long; nearly as wide between first coxae; posterior end bluntly rounded and not extended between fourth coxae which are separated by their width. Sternal suture straight.

*Legs.* 2143. Width of first patella at "knee" .1998 mm., tibial index of first leg 12. Width of fourth patella at "knee" .1554 mm., tibial index of fourth leg 15.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	1.408	.448	1.240	1.088	.704	3.772
2.	1.536	.512	1.350	1.088	.704	4.190
3.	.832	.384	.640	.448	.448	2.752
4.	1.024	.320	.704	.480	.448	2.976
Palp	.466	.244	.178	—	.420	1.308

*Spines.* First leg: femur dorsal 0-1-1-1-0 on left, 0-1-1-0-0 on right, prolateral 0-0-1-1-1-0, retrolateral 0-0-1-1-0; patella dorsal 1-1, prolateral and retrolateral 1-1; tibia dorsal 0-1-1-0 left, 0-1-1-1-0 on right, prolateral 1-0-1-0, retrolateral 1-1-1-0, ventral 0-2-2-0; metatarsus dorsal 0, prolateral 0-1-0, retrolateral 0, ventral 0-2-2-2 (offset laterally). Second leg: essentially as in first with few exceptions. Third leg: femur dorsal 0-1-1-1-1-0 on right, 0-1-0-1-0 on left, prolateral 0-0-0-1-0; patella dorsal 1-1; tibia dorsal 0-1-0-1-0, prolateral 0-0-1-0, retrolateral and ventral 0; metatarsus dorsal 0, prolateral 1-0-1-0, retrolateral 0-0-1-0, ventral 0-1r-0. Fourth leg: femur dorsal 0-1-1-0 on right, 0-1-1-1-0 on left, elsewhere 0; patella only dorsal 1(bristle)0-1; tibia dorsal 0-0-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-0, ventral 0; metatarsus only prolateral 0-0-1-0. Palpal spines: only two long slender dorsal spines on patella 1-1.

*Palp.* Relatively simple, short and fairly robust. Femur somewhat thickened; greatest width of tibia nearly equal to greatest length. Tibia with a short broad membranous retrolateral apophysis ventral to a short, strongly chitinized tubercle; between these structures there is a low membranous ridge. The tarsus is short and broad with the only visible spine arising as a robust structure near middle of prolateral side and twisting spirally at middle of anterior surface of bulb where it turns backward in a marked enlargement and terminates in a sharp point directed somewhat retrolaterally (Figs. 16-17).

*Abdomen.* Moderately robust; rounded at base; widest just anterior to reduced median dorsal tubercle which lies about one third of total length from posterior end; longer than wide in ratio of about 7 : 4; tapered quite sharply from widest region to anal tubercle which is a fairly prominent and somewhat flattened cone; quite spinose dorsally with each spine usually arising from a yellowish patch; six spinnerets as usual in the genus; a distinct colulus not observed; position of tracheal spiracle near base of spinnerets obscure and not marked by any definite lip or tubercle; with four dorsal sigilla, the posterior pair of which is much larger than anterior pair.

*Color in alcohol.* Carapace generally a rich medium brown with eight lighter radiating and more or less wavy stripes and bands meeting just anterior to the top of smooth posterior declivity; the lighter stripes and bands enclose nine thin yellowish white lines; low along the lateral sides are additional lighter bands and yellowish white lines; clypeus with four lighter perpendicular streaks. Legs generally yellowish; all more or less dotted with reddish spots but third and fourth more so while first and second have more whitish spots but they are also mottled with reddish and brownish along prolateral surfaces



of the femora. Maxillae and palpi yellowish. Lip yellowish in distal third, brownish elsewhere. Chelicerae generally brownish with lighter streaks on anterior surfaces. Sternum lighter brownish. Abdomen: dorsum variegated with different shades of red and yellowish white difficult to describe adequately; lateral sides shiny yellowish white with darker dots arranged in broken longitudinal rows; venter yellowish, dusted with brownish; a rectangular dark patch occupies the region in front of genital groove; a dark narrow ring surrounds bases of spinnerets.

*Type locality.* Male allotype from C. Z. Biological Area, C. Z., August, 1939. Numerous male paratypes and females from the following localities: C. Z. Biological Area, June–July, 1934; June–August, 1936; June–August, 1939; Ft. Randolph and Ft. Davis, C. Z., August, 1936; Madden Dam region, July, 1936 and August, 1939; C. Z. Forest Reserve, C. Z., July–August, 1939; Gamboa, C. Z., August, 1939.

#### TMARUS PAUPER O. P.-Cambridge, 1892

*T. pauper* F. P.-Cambridge, 1900

*T. pauper* Petrunkevitch, 1911

*T. pauper* Petrunkevitch, 1925

The Cambridges had only males from Bugaba. The species has not appeared in my collections and, so far as I know, has not been collected since its original discovery.

#### TMARUS PARKI spec. nov.

Figures 19–20

*Male holotype.* Total length 5.056 mm. Carapace 1.856 mm. long; 1.664 mm. wide opposite second coxae where it is widest; about .960 mm. tall and, therefore, about .57 as tall as wide; very gently arched behind PME to beginning of steep posterior declivity which descends quite steeply to posterior border which is nearly straight; without a definite thoracic groove; ventral margin with irregularities opposite intervals between first and second, and second and third coxae.

*Eyes.* Eight in two rows, all diurnal. LE on moderately prominent tubercles; PME slightly raised from general surface; AME hardly raised at all; viewed from above, posterior row strongly recurved; viewed from in front, anterior row straight measured by centers; central ocular quadrangle wider behind than in front in ratio of 19 : 14, wider behind than long in ratio of 19 : 17; posterior row occupies about

three fourths of width of carapace at that level. Ratio of eyes AME : ALE : PME : PLE = 2.5 : 5 : 3 : 4.25. AME separated from one another by nearly four times the diameter of one of them, from ALE by slightly more than three times the diameter of one of them. PME separated from one another by nearly five times the diameter of one of them, from PLE by slightly more than five times the diameter of one of them. Laterals separated from one another by thirteen fifths of the diameter of ALE. Clypeus markedly porrect, thus adding to the length of the carapace. Height of clypeus, including membranous ventral border, equal to nine times the diameter of AME. Clypeus with the usual seven long slender spines near ventral margin, but middle one situated near middle of space beneath AME.

*Chelicerae*. Basal segment .576 mm. long; considerably porrect. Other features as usual in the genus.

*Maxillae*. Only slightly convergent, but basal half encroaches upon lip so that latter has the appearance of being pinched between the two maxillae; basal half robust, distal half moderately slender; longer than lip in ratio of about 3 : 2; longer than wide at middle constriction in ratio of 27 : 8; distal end with a moderately well developed scopula; serrula extends far over lateral surface.

*Lip*. Very narrow at base; longer than wide at base in ratio of 17 : 15; widest in middle; distal end quite squarely truncated and with a row of stiff bristles. Sternal suture gently recurved.

*Sternum*. In general, broadly scutiform; longer than wide in ratio of 6 : 5; widest between second coxae, but nearly as wide between first; posterior end bluntly pointed and not extended between fourth coxae which are separated only by a little less than one fifth of the width of one of them.

*Legs*. 1243. Width of first patella at "knee" .333 mm., tibial index of first leg 11. Width of fourth patella at "knee" .222 mm., tibial index of fourth leg 14.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.496	.928	2.028	1.600	1.024	8.096
2.	2.432	.896	2.048	1.600	1.024	8.000
3.	1.152	.480	1.056	.512	.576	3.776
4.	1.408	.512	1.024	.512	.576	4.032
Palp	.544	.288	.224	—	.576	1.632

*Spines*. First leg: femur dorsal 0-0-1-1-1-0, prolateral 0-1-1-1-1-0, retrolateral 0-1-1-1-0; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral and retrolateral

-0-11-1-0, ventral 1r-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 1-1-0, ventral 2-2-2-2. Second leg: femur as in first except retrolateral 0-0-1-1-0; patella and metatarsus as in first; tibia as in first except ventral 0-2-2-0. Third leg: femur dorsal 0-1-1-0, prolateral 1-0-1-0; patella dorsal 1-1, prolateral and retrolateral spines replaced by bristles; tibia dorsal 0-1-1-0, prolateral and retrolateral 0-0-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral 0-1-0, retrolateral 1-1-0, ventral 0-2-0. Fourth leg: femur and patella as in third except patella retrolateral 0-1(weak)-0; tibia as in third except prolateral 0-1-1-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-1p. Palpal spines: femur dorsal 0-1-2(weak); numerous other long slender spines irregularly placed on patella, tibia, and tarsus.

*Palp.* Complicated; only tibia and tarsus modified. Tibia with a dorsal and ventral retrolateral apophysis; ventral apophysis arises toward the base of the tibia as a strongly chitinized spur curving gently toward the long dorsal apophysis which arises from the extended distal margin of the tibia as a stout long pointed spur reaching considerably beyond middle of bulb. Bulb with three characteristic features as follows: a strongly chitinized ridge arises near retrolateral side, turns toward prolateral side, extends somewhat diagonally across near posterior margin, then turns at a right angle and terminates as a sharply pointed spine; a centrally placed chitinized ridge extends to anterior margin; the embolus arises on prolateral side, curves to anterior border where a prominent swelling occurs and then extends to retrolateral side where it terminates in a slender spine (Figs. 19-20).

*Abdomen.* Elongated and generally cylindrical in shape with sides nearly parallel from bluntly rounded base to near posterior end; longer than wide in ratio of 27 : 7; dorsally and dorsolaterally with many long slender spines each arising from a distinct pit; other features as usual in the genus.

*Color in alcohol.* Carapace generally yellowish; somewhat darkened areas with lighter streaks indicate that in nature there may be a more definite color pattern than shows in the holotype; the usual whitish areas around all eyes but particularly around LE. Mouth parts, legs, and sternum all yellowish with legs darker above. Abdomen: generally yellowish; with a whitish patch at base; dorsum with many irregular small whitish patches; each spine arises from a small yellowish area with each area more or less surrounded by an irregular whitish ring; laterally and ventrolaterally with numerous small yellowish dots in a whitish background; venter yellowish with a vague darker patch just anterior to genital groove and another just anterior to tracheal spiracle.

*Type locality.* Male holotype from C. Z. Biological Area, C. Z., July, 1936. No paratypes.

*Note:* *T. parki* sp. nov. is regarded as being very closely related to *T. peregrinus* sp. nov. The species is dedicated to Dr. Orlando Park, Northwestern University, Evanston, Illinois with whom I collected in the C. Z. Biological Area throughout the greater part of the summer of 1936.

*TMARUS PEREGRINUS* spec. nov.

Figures 21-22

*Male holotype.* Total length 4.80 mm. Carapace 1.920 mm. long; 1.632 mm. wide opposite second coxae where it is widest; .825 mm. tall and, therefore, about .50 as tall as wide; almost level behind PME to steep posterior declivity; otherwise essentially as in *T. parki*.

*Eyes.* Viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider behind than in front in ratio of about 7 : 5; wider behind than long in ratio of about 21 : 17; posterior row occupies about eleven fifteenths of width of carapace at that level. Ratio of eyes AME : ALE : PME : PLE = 3 : 5.5 : 4 : 5. AME separated from one another by ten thirds of the diameter of one of them, from ALE by three times the diameter of one of them. PME separated from one another by seven halves of the diameter of one of them, from PLE by slightly more than four times the diameter of one of them. Laterals separated from one another by nearly three times the diameter of PLE. Clypeus considerably porrect, thus adding considerably to the length of the cephalothorax. Width of clypeus, including membranous ventral border, nearly seven times the diameter of AME. Otherwise essentially as in *T. parki*.

*Chelicerae.* Only slightly porrect; basal segment .704 mm. long; other features as usual in the genus.

*Maxillae.* Longer than lip in ratio of 15 : 11; longer than wide at middle constriction in ratio of 15 : 4; otherwise essentially as in *T. parki*.

*Lip.* Longer than wide at base in ratio of about 3 : 1; sternal suture straight; otherwise essentially as in *T. parki*.

*Sternum.* Somewhat more elongated than in *T. parki* sp. nov.; moderately convex; longer than wide in ratio of about 23 : 16; fourth coxae separated by about one third of their width. Otherwise as in *T. parki*.

*Legs.* 1 = 243. Width of first patella at "knee" .3108 mm., tibial index of first leg 10. Width of fourth patella at "knee" .222 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.560	.896	2.176	1.664	1.024	8.320
2.	2.688	.896	2.048	1.664	1.024	8.320
3.	1.376	.576	1.152	.640	.576	4.320
4.	1.600	.544	1.120	.640	.576	4.480
Palp	.576	.320	.256	—	.608	1.760

*Spines.* First leg: femur dorsal 0-0-1-1-0, prolateral and retrolateral 0-1-1-1-0, ventral 0 (spines recorded here are as they occur on right side; on left side there are ten with irregular placement); patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-1-1-0, ventral 0-1p-2-1p-2-0 on right, 0-2-2-0 on left; metatarsus dorsal 0-1-0-0, prolateral and retrolateral 2-2-0, ventral 1p-2-2-2 on left, but 2-2-1p-2-2 on right with some irregularity of placement. Second leg: femur and patella as in first except femur prolateral 0-1-1-1-0-1-0 on right with left leg missing; tibia as in first except ventral 0-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 1-1-0, ventral 0-2-2-2. Third leg: femur only dorsal 0-1-1-1-0 and prolateral 1-0-1-0; patella dorsal 1-1 and probably prolateral and retrolateral 0-1-0; tibia dorsal 0-1-1-0, prolateral and retrolateral 0-0-1-0, ventral 0-2-0; metatarsus dorsal 0; prolateral and retrolateral 0-1-0, ventral 0-2-0. Fourth leg: femur only dorsal 0-1-1-0 and prolateral 0-1-1-1-0; patella only dorsal 1-1 and prolateral 0-1(weak)-0; tibia dorsal 0-1-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-1p. Palpal spines: femur dorsal 0-1-2, prolateral 0-0-1; several long slender spines irregularly placed on patella and tibia.

*Palp.* Complicated; only tibia and tarsus modified. Tibia with two retrolateral apophyses; the ventral one a strongly chitinized hook-like process; the dorsal one also strongly chitinized and somewhat flask-shaped spur. Bulb of tarsus with a basal hook; at anterior margin of bulb a broad band terminates on retrolateral side in two hooks, the larger of which is regarded as the embolus. Similar to but clearly distinct from that of *T. parki*. (Figs. 21-22).

*Abdomen.* Longer than wide in ratio of 25 : 8. Otherwise essentially as in *T. parki*.

*Color in alcohol.* Almost identical with that of *T. parki* except that the abdominal markings are somewhat less distinct than in that species.

*Type locality.* Male holotype from C. Z. Biological Area, C. Z., July, 1934. No paratypes. Probably an unusual species.



Note: This species and *T. parki* were at first sorted out and placed together on account of their close resemblance to one another. A careful study has clearly revealed that they must be regarded as representing two clearly distinct, but closely related, species.

*TMARUS PROBUS* spec. nov.

Figures 23-24

*Male holotype.* Total length 3.584 mm. Carapace 1.344 mm. long; 1.216 mm. wide opposite second coxae where it is widest; .672 mm. tall and, therefore, about .55 as tall as wide; nearly level from just behind PME to beginning of steep posterior declivity opposite interval between third and fourth coxae; without a definite median thoracic groove; ventral margin regularly and quite fully rounded from constriction beneath interval between LE to posterior border which is very concave.

*Eyes.* Eight in two rows, all diurnal. LE on prominent tubercles; PME somewhat raised from general surface; AME hardly raised at all; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved measured by centers; central ocular quadrangle wider behind than in front in ratio of 15.5 : 11.5; posterior row occupies slightly more than full width of carapace at that level. Ratio of eyes AME : ALE : PME : PLE = 2.5 : 5 : 3 : 4.5. AME separated from one another by slightly less than three times the diameter of one of them, from ALE by three diameters of one of them. PME separated from one another by ten thirds of the diameter of one of them, from PLE by slightly less than five times the diameter of one of them. Laterals separated from one another by twelve fifths of the diameter of ALE. Clypeus quite porrect thus adding somewhat to length of cephalothorax. Width of clypeus, including membranous ventral margin, equal to nearly six and a half times the diameter of AME. Clypeus with the usual seven spines near ventral margin, including the one set a little above the others beneath interval between AME.

*Chelicerae.* Only slightly porrect; basal segment .576 mm. long; with one long slender spine on each in front, about one third from base and near medial surface together with several shorter, weaker spines hardly more than bristles along medial surface; otherwise as usual in the genus from Panama.

*Maxillae.* Longer than lip in ratio of 11 : 7; longer than wide at middle constriction in ratio of about 22 : 7; basal half with a row of three very slender spines through middle; distal half with numerous

bristles and a few long slender spines; otherwise essentially as in *T. parki*.

*Lip.* Longer than wide at base in ratio of 15 : 7; wider at base than at distal end in ratio of 7 : 4; distal end squarely truncated with a row of stiff black bristles. Sternal suture straight or slightly recurved.

*Sternum.* Broadly scutiform; longer than wide in ratio of 18 : 15; moderately convex; posterior end a blunt point, not extended between fourth coxae which are separated by three fifths the width of one of them.

*Legs.* 1243. Width of first patella at "knee" .222 mm., tibial index of first leg 10. Width of fourth patella at "knee" .1770 mm., tibial index of fourth leg 14.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
(All measurements in millimeters)						
1.	1.856	.672	1.664	1.344	.832	6.368
2.	1.856	.640	1.632	1.280	.832	6.240
3.	.960	.384	.800	.511	.480	3.135
4.	1.088	.384	.832	.512	.480	3.296
Palp	.444	.222	.155	—	.511	1.332

*Spines.* First leg: femur dorsal 0-1-1-1-0, proteral 1-1-1-1-0, retrolateral 0-0-1-1-0; patella dorsal 1-1, proteral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, proteral and retrolateral 1-1-1-0, ventral 0-2-2-0; metatarsus dorsal 0, proteral 1-1-1-0, retrolateral 0-1-1-0, ventral 0-2-2-2. Second leg: essentially as in first. Third leg: femur only dorsal and proteral 0-1-1-0 on right, proteral on left 0-0-1-0; patella only dorsal 1-1; tibia dorsal 0-1-0-1-0, proteral and retrolateral 0-1-0, ventral 0-2-0; metatarsus dorsal 0, proteral and retrolateral 0-1-0, ventral 0-2-0. Fourth leg: left almost completely devoid of spines; right as follows: femur and patella as in third except femur proteral 0-0-1-0; tibia as in third except ventral 0-1p-0; metatarsus as in third. Palpal spines: femur dorsal 0-1-1-2 (some irregularity in placement); patella, tibia, and tarsus with several long slender spines irregularly placed.

*Palp.* Complicated; only tibia and tarsus modified. Tibia with two retrolateral apophyses; ventral one a stout hook; dorsal one a long, sharply pointed spur curved ventrally and provided with four small denticles, only seen in ventral view. Bulb with a short stout basal spine, a longer retrolateral and more slender spine, probably the embolus, a central semilunate ridge, and a distal and somewhat retrolateral, triangular, striated structure, and between the base of the basal spine and the striated structure a broad low shell-like structure extends (Figs. 23-24).

*Abdomen.* Elongated and more or less cylindrical; longer than wide in ratio of about 38 : 13; widest about three fifths from base; a slightly raised median dorsal region capped by a cluster of five spines may indicate the position of a reduced tubercle and a caudal "appendage" a short distance anterior to anal tubercle. Otherwise as usual in the genus from Panama.

*Color in alcohol.* Carapace generally a clear yellowish; dorsal area with irregular reddish spots arranged in a pair of short vague stripes; clypeus reddish along ventral margin and beneath ALE; with a narrow reddish ventral border; with a few small isolated reddish spots along lateral sides. Legs generally yellowish; femora one and two with many small reddish prolateral spots. Mouth parts and sternum yellowish. Abdomen: generally yellowish; small reddish dots are clustered at base of dorsum; a small red dot lies at base of many of the numerous long slender spines; a very narrow median white stripe from base to the first of a series of narrow white bars; the first bar is about two thirds of total length from base; the third bar is short and the fourth and last bar is confined to the suppressed median dorsal tubercle and broken into separate small spots; laterally with vague dark brownish and occasionally reddish spots; venter yellowish with small irregular dark spots in region of tracheal spiracle.

*Type locality.* Male holotype from Madden Dam region, C.Z., August, 1939. Seven male paratypes from the following localities: Balboa, C. Z., August, 1936; El Valle, R. P., July, 1936; Arraijan, R. P., August, 1936; Taboga Island, R. P., August, 1946 (N. L. H. Kraus); Cocoli, C. Z., August, 1946 (N. L. H. Kraus); the last two loaned for study by Dr. W. J. Gertsch.

Note: This species is regarded as being closely related to *T. studiosus* O. P.-Cambridge.

#### TMARUS PRODUCTUS spec. nov.

Figures 25-26

*Male holotype.* Total length 3.328 mm. Carapace 1.280 mm. long; 1.216 mm. wide between second coxae where it is widest; .640 mm. tall and, therefore, about .53 as tall as wide; nearly level behind PME to beginning of steep posterior declivity which is quite steeply arched to posterior border; without any definite thoracic groove; well rounded from opposite interval between LE to posterior border which is only gently concave; ventral border regularly rounded.

*Eyes.* Eight eyes in two rows, all diurnal. LE on moderately prominent tubercles; ME on slightly raised tubercles; viewed from above,

posterior row strongly recurved; viewed from in front, anterior row straight measured by centers; central ocular quadrangle wider behind than in front in ratio of 7 : 4, wider behind than long in ratio of 14 : 13; posterior row occupies nearly full width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 2.3 : 5.5 : 3 : 5. AME separated from one another by a little less than two diameters of one of them, from ALE by nearly two diameters of one of them. PME separated from one another by seven thirds of the diameter of one of them, from PLE by a little less than four diameters of one of them. LE separated from one another by slightly more than two diameters of PLE. Clypeus moderately porrect. Width of clypeus, including membranous ventral border, equal to a little more than five diameters of AME.

*Chelicerae.* Only slightly porrect; basal segment .448 mm. long. Other features as usual in the genus from Panama.

*Maxillae.* Slightly convergent; basal half considerably inflated, distal half moderately slender; longer than wide at middle constriction in ratio of 13 : 7; distal end with a moderately well developed scopula; serrula extends far over outer distal corner and lateral surface.

*Lip.* Longer than wide at base in ratio of 13 : 6; not much wider at middle than at base; distal end well rounded, with a cluster of black bristles. Sternal suture straight.

*Sternum.* Broadly scutiform; longer than wide in ratio of 17 : 16; quite convex; widest between second coxae but nearly as wide between first coxae; well supplied with a covering of short slender bristles; posterior end bluntly pointed, not extended between fourth coxae which are separated by about their width.

*Legs.* 1243. Width of first patella at "knee". .2442 mm., tibial index of first leg 9. Width of fourth patella at "knee" .2220 mm., tibial index of fourth leg 16

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.240	.704	2.048	1.568	.896	7.456
2.	2.176	.704	1.984	1.536	.896	7.296
3.	1.088	.384	.832	.512	.480	3.296
4.	1.152	.416	.960	.576	.544	3.648
Palp	.512	.232	.192	—	.576	1.512

*Spines.* First leg: femur dorsal 0-0-1-1-0, prolateral 0-1-1-1-0, retrolateral 0-0-1-1-0; patella only dorsal 1-1; tibia dorsal 0-1-0-0-0, prolateral and retrolateral 1-1-1-0, ventral 0-2-1p-0; metatarsus dorsal 0, prolateral 0-1-0, retrolateral 1-1-0, ventral 0-2-2-1-0.

Second leg: femur as in first except prolateral 0-0-1-1-0; patella as in first; tibia dorsal as in first, prolateral and retrolateral 0-1-1-0, ventral 0-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-0, ventral 0-2-2-0. Third leg: femur only dorsal 0-1-1-0; patella only dorsal 1-1; tibia only dorsal 0-0-1-0 and ventral 0-1p-0; metatarsus only prolateral 0-1-0 and ventral 0-2-0. Fourth leg essentially as in third.

*Palp.* Complicated; only tibia and tarsus modified. Tibia with two long, strongly chitinized, retrolateral apophyses lying close together and extending beyond middle of bulb on retrolateral side; near base of ventral apophysis there occurs a short stout chitinized hook. Cymbium with a characteristic notch near tip on retrolateral side. The most characteristic feature of the bulb is an embolus which arises near distal margin, describes almost a complete circle as a deeply grooved and spirally twisted band, after which it proceeds to describe a long loose loop opposite the base of the tarsus and the body of the tibia where it turns back distally after more twisting to terminate as a fine thread near tip. Through much of the distance from origin to termination the embolus is far removed ventrally from the surface of the bulb (Figs. 25-26).

*Abdomen.* Total length 1.984 mm.; longer than wide in ratio of 31 : 17 at widest part, about two fifths of total length from posterior end; blunt at base, tapered to a point from widest part to tip of anal tubercle; apparently with two nearly suppressed dorsal tubercles about one third from base, with each supplied with a long stout spine; also with a single reduced median dorsal tubercle opposite widest part; other features as usual in the genus from Panama.

*Color in alcohol.* Among the more highly colored species of the genus. Carapace: with a yellowish white triangular area with apex at top of steep posterior declivity and base including eye region; within this area are brownish dots and whitish lines; steep posterior declivity darker yellowish; elsewhere brown with whitish lines and streaks; clypeus with a whitish band across the center and brownish with many lighter streaks elsewhere. Legs: generally yellowish with many small irregular reddish brown and whitish spots; on femora especially, but also to a lesser extent on some other segments these spots are lacking; first and second femora with a ventral black spot at distal end; first and second tibiae with a dorsal white spot at distal end; first and second metatarsi each with a narrow black distal band. Chelicerae dark brownish in front with a whitish streak along dorsolateral edge connecting with a distal medial white spot. Palpal cymbium nearly black dorsally. Elsewhere mouth parts and sternum yellowish. Abdomen: with a somewhat vaguely outlined sagittate lighter colored



stripe from base to reduced median dorsal tubercle; behind tubercle there is another delimited whitish stripe crossed by several narrow reddish lines; elsewhere dorsum and lateral sides darkly variegated with black, white, and reddish dots and streaks intercommunicating; venter yellowish with a dark patch just in front of genital groove, ventrolaterally whitish.

*Type locality.* Male holotype from Porto Bello, R. P., August, 1936. No paratypes.

TMARUS SIGILLATUS spec. nov.

Figures 27-28

*Male holotype.* Total length 4.256 mm. Carapace 1.792 mm. long; 1.600 mm. wide opposite second coxae where it is widest; .704 mm. tall and, therefore, about .44 as tall as wide; gently arched behind PME to steep posterior declivity; declivity steeply arched to posterior border which is moderately concave in middle; ventral border somewhat irregular in outline along lateral sides.

*Eyes.* Eight in two rows, all diurnal; LE on prominent tubercles; PME on small tubercles; AME slightly raised from general surface; viewed from above, posterior row strongly recurved; viewed from in front, anterior row somewhat more recurved than usual in the species, measured by centers; central ocular quadrangle wider behind than in front in ratio of 19 : 14, wider behind than long in ratio of 19 : 16; posterior row occupies the full width of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 3 : 6 : 4 : 5.3 AME separated from one another by three diameters of one of them, from ALE by nearly three diameters. PME separated from one another by nearly three and a half diameters of one of them, from PLE by four diameters of one of them. Laterals separated from one another by nearly two diameters of ALE. Clypeus quite porrect. Height of clypeus, including narrow membranous ventral border, equal to nearly five and one half diameters of AME. Clypeus with the usual seven spines along the ventral border of chitinous area.

*Chelicerae.* Only slightly porrect; basal segment .644 mm. long. Other features as usual in the genus from Panama.

*Maxillae.* Slightly convergent; basal half considerably inflated, distal half much slenderer; longer than wide at middle constriction in ratio of 15 : 4; longer than lip in ratio of 3 : 2; other features as described for *T. productus*.

*Lip.* Longer than wide at base in ratio of 5 : 2; sternal suture straight; other features as described for *T. productus*.



*Sternum.* Longer than wide in ratio of 43 : 35; fourth coxae separated by three sevenths of their width. Otherwise essentially as described for *T. productus*.

*Legs.* 1234. Width of first patella at "knee" .3552 mm., tibial index of first leg 11. Width of fourth patella at "knee" .2664 mm., tibial index of fourth leg 17.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.200	.992	2.880	2.496	1.120	10.688
2.	3.136	.992	2.816	2.304	1.024	10.272
3.	1.280	.576	1.216	.704	.576	4.352
4.	1.408	.544	1.024	.704	.576	4.256
Palp	.576	.288	.256	—	.576	1.696

*Spines.* First leg: femur dorsal 1-1-1-1-1-0, prolateral 0-0-1-1-1 (crowded and irregular)-1-0, retrolateral 0-0-1-1-0, ventral 0; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-1-1-0, ventral 0-2-2 (both pairs irregular in position)-1p-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-1-0-0, ventral 0-1r-2 (irregular)-1r-1p-2-2. Second leg: femur dorsal 0-1 (bristle)-1-1-0, prolateral 0-1-1-1-0, retrolateral 0-0-1-1-0; patella as in first; tibia as in first except ventral 0-2-2-0; metatarsus dorsal 0, prolateral and retrolateral 0-1-1-0-0, ventral 0-2-2-2-2. Third leg: femur only dorsal 0-1-1-0 and prolateral 0-0-1-0; patella only dorsal 1-1; tibia dorsal, prolateral, and retrolateral 0-0-1-0, ventral 0-1p-0; metatarsus dorsal 0, prolateral 0-1-1-0-0, retrolateral 0-0-1-0, ventral 0-2-0-0. Fourth leg: femur only dorsal 0-1-0-1-0; patella as in third; tibia dorsal 1-0-1-0, prolateral and retrolateral as in third, ventral 0; metatarsus only prolateral 0-1-1-0, retrolateral 0-1-0, ventral 0-2-0-0. Claws: on second leg, pectinate in a single row with eight or nine teeth.

*Palp.* Complicated; only tibia and tarsus modified. Tibia with two distal retrolateral apophyses; the ventral of these is a strongly chitinized spur; the dorsal is a blunt, rounded, strongly chitinized process, concave toward the spur. The bulb is deeply excavated toward the retrolateral side; there is a short, sharply pointed spine contiguous to the tibial spur; opposite this spine on the prolateral side of the bulb there is a strongly chitinized hook. The embolus extends from the retrolateral side of the base of the bulb around nearly three fourths of the margin of the bulb and terminates in a marked dilation bluntly truncated at its tip (Figs. 27-28). The tibia appears to support a cluster of four dorsal trichobothria.

*Abdomen.* Elongated and more or less cylindrical; longer than wide in ratio of 21 : 10; widest about five eighths from base; a short distance behind widest part is a low median dorsal tubercle; dorsal and dorso-lateral areas with numerous stout and apparently erectile spines each arising from a somewhat conspicuous red-tipped tubercle. Other features as usual in the genus from Panama.

*Color in alcohol.* Carapace a light brownish, speckled with yellowish flecks and, along the margins of the posterior declivity, irregular brown spots; a V-shaped area extending from PLE to beginning of steep posterior declivity is margined by an irregular yellowish border; sternum is yellowish. Legs generally yellowish with many small reddish spots especially along prolateral surfaces of femora of first two pairs. Abdomen: dorsal area highly variegated with irregular yellowish, reddish, and black streaks and spots; just lateral to the median dorsal tubercle on each side is an irregular black spot; venter is a yellowish with a double row of small lighter colored dots extending from in front of tracheal spiracle to genital groove and diverging somewhat anteriorly.

*Type locality.* Male holotype from Canal Zone Forest Reserve, C. Z., August, 1939. No Paratypes.

#### TMARUS STUDIOUS O. P.-Cambridge, 1892

##### Figures 29-31

*T. studiosus* F. P.-Cambridge, 1900

*T. studiosus* Petrunkevitch, 1911

*T. studiosus* Petrunkevitch, 1925

*T. studiosus* Banks, 1929

The Cambridges had both sexes from Bugaba, Panama. Mr. Banks had both sexes from the C. Z. Biological Area, C. Z. I have numerous specimens of both sexes from the following localities: C. Z. Biological Area, June-July, 1934; June-August, 1936; June-August, 1939; June-October, 1940 (Zetek, Berlese funnel); Gamboa and Ft. Sherman, C. Z., August, 1939.

BIBLIOGRAPHY

BANKS, NATHAN

1929. Spiders from Panama. Bull. Mus. Comp. Zoöl. at Harvard College, **69**, pp. 53-96, 4 pls.

CAMBRIDGE, O. P. and CAMBRIDGE, F. P.

- 1889-1905. Arachnida-Araneida. Vols. I-II. In: *Biologia Centrali-Americana*. Dulau & Co., London.

PETRUNKEVITCH, ALEXANDER

1911. A Synonymic Index-Catalogue of Spiders of North, Central, South America, etc. Bull. Amer. Mus. Nat. Hist., New York, **29**, pp. 1-809.
1925. Arachnida from Panama. Trans. Conn. Acad. Arts and Sci., **27**, pp. 51-248.